

Claims:

1. (withdrawn) A locking nut and bolt system comprising:

a bolt having a bolt stem and a bolt thread on an axial centerline thereon, said bolt thread defining bolt thread crests and bolt thread troughs;

a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope;

a nut having a nut thread defined in an internal passageway and an end face, said nut thread being complementary to said bolt thread;

a recess defined on said end face of said nut, said recess having a central region, a recessional mouth open to said internal passageway and a tangential cavity tangentially disposed with respect to said nut thread and having a predetermined shape;

an elongated tine having a planar body, a distal tine end angularly disposed at an offset position with respect to said planar tine body and adapted to ride on said bolt thread crest and fall into at least one of said plurality of notches, and said tine having a proximal end formed as loop, said proximal end loop shaped complementary to said tangential cavity shape;

whereby said proximal end loop of said tine is disposed in said tangential cavity of said recess and said recess defines a radial space behind said tine body such that said tine body moves radially within said radial space of said recess when said distal tine end rides atop said bolt thread crest and moves radially inward when said distal tine end moves into said at least one of said plurality of notches, and said lock face of said notch preventing counter-rotational movement of said bolt with respect to said nut when said distal tine end abuts said lock face.

2. (withdrawn) A locking nut and bolt system as claimed in claim 1 wherein said recessional central region is substantially co-planar with said tangential cavity and said proximal end loop is U-shaped with each leg being disposed in substantially parallel planes whereby said proximal end loop exerts opposing spring forces against nut walls forming said tangential cavity.

3. (withdrawn) A locking nut and bolt system as claimed in claim 1 wherein said tangential cavity is angularly offset with respect to said central region of said recess and said proximal end loop of said tine is U-shaped and is offset with respect to said planar tine body, said U-shaped proximal end loop exerting radially directed, opposing spring forces against nut walls forming said tangential cavity.

4. (withdrawn) A locking nut and bolt system as claimed in claim 1 wherein said planar tine body is disposed in a tangential plane with respect to said axial centerline of said bolt and said proximal end loop is perpendicular with respect to said planar tine body, said proximal end loop is a solid planar element sized to fit within said tangential cavity.

5. (withdrawn) A locking nut and bolt system as claimed in claim 1 wherein said plurality of notches are longitudinally aligned.

6. (withdrawn) A locking nut and bolt system as claimed in claim 1 wherein said plurality of notches are disposed in a spiral on said bolt thread.

7. (currently amended) A locking nut and bolt system comprising:  
a bolt having a bolt stem along an axial centerline and a bolt thread formed on said bolt stem, said bolt thread defining bolt thread crests and bolt thread troughs;

a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope;

a nut having a nut thread defined in an internal passageway and an end face, said nut thread being complementary to said bolt thread;

a recess defined on said end face of said nut and a shoulder defined on a periphery of said recess below said nut end face;

a nut insert disposed in said recess on said shoulder, said nut insert having a planar body defined as a peripheral ring about said nut thread, said nut insert having ~~at least one tine~~ a plurality of tines depending from said planar peripheral ring body in a substantially tangential plane with respect to said axial centerline of said bolt, each said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said peripheral planar body of said nut insert;

said plurality of tines circumferentially disposed about a radially inward edge of said planar peripheral ring of said nut insert, each tine having a respective planar body which is generally tangentially disposed with respect to said axial centerline and said respective distal tine end angularly disposed and radially inwardly disposed away from said tine planar body:

    said planar peripheral ring defining a radial free space axially there below in said nut recess such that said distal tine end of said axially tangential tine moves radially inward when said distal tine end is disposed in one or more notches and moves radially outward into said radial free space when said distal tine end rides on said bolt thread crest, and said lock face of said notch preventing

counter-rotational movement of said bolt with respect to said nut when said distal tine end abuts said lock face.

8. (original) A locking nut and bolt system as claimed in claim 7 wherein said planar peripheral ring defines one of a key and a keyway and said nut recess defines one of a complementary keyway and a complementary key thereby permitting circumferential alignment of said nut insert with respect to said nut.

9. (currently cancelled)

10. (original) A locking nut and bolt system as claimed in claim 7 wherein said nut insert includes a plurality of tines circumferentially disposed and wherein said planar peripheral ring of said nut insert includes a corresponding planar support plate for each of said plurality of tines, each said planar support plate extending radially inward toward said axial centerline thereby creating said radial free space for the radial movement of said tine there beneath and radially spacing said movable tine away from said shoulder of said recess.

11. (original) A locking nut and bolt system as claimed in claim 10 wherein said planar peripheral plate includes an outer peripheral planar section from which extends said corresponding planar support plates, said outer peripheral planar section having a radial dimension substantially equivalent to said shoulder in said recess.

12. (original) A locking nut and bolt system as claimed in claim 7 wherein said plurality of notches are longitudinally aligned.

13. (original) A locking nut and bolt system as claimed in claim 7 wherein said plurality of notches are disposed in a spiral on said bolt thread.

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23. (withdrawn) A locking nut and bolt system comprising:

a bolt having a bolt stem along and an axial centerline and a bolt thread formed on said bolt stem, said bolt thread defining bolt thread crests and bolt thread troughs;

a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope;

a nut having a nut thread defined in an internal passageway and an end face, said nut thread being complementary to said bolt thread;

a recess defined on said end face of said nut below said nut end face and a shallow radial ledge peripherally disposed about said recess;

two elongated locking units, each elongated locking unit formed as a cylinder with at least one tine protruding tangentially and radially inward toward said axial centerline, at least one said locking unit sized to fit within said nut recess, each said locking unit having an axial end ring member;

means for mounting one elongated locking unit atop said other locking unit by interfacing respective axial end ring together;

said one locking unit disposed in said nut recess and said interfaced axial end rings disposed on said shallow radial ledge of said nut end face;

each said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent a corresponding cylinder;

each said distal tine end moves radially inward when said distal tine end is disposed in one or more notches and moves radially outward when said distal tine end rides on said bolt thread crest,

and said radially inward and outward movement being visible due to the disposition of said elongated locking unit on said end face of said nut, and said lock face of said notch preventing counter-rotational movement of said bolt with respect to said nut when said distal tine end abuts said lock face.

24. (withdrawn) A locking nut utilized with a bolt having a bolt stem and a bolt thread on an axial centerline thereon, said bolt thread defining bolt thread crests and bolt thread troughs, said bolt thread carrying a plurality of notches generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope, said locking nut comprising:

a metal sheet bent to form first, second, third and fourth generally planar sides, said first and third sides in opposition and said second and fourth sides defining opposing nut end faces;

a nut thread formed on one of said second and said fourth sides, said nut thread disposed about an axial centerline and being complementary to said bolt thread;

a locking unit formed on at least one of said first and third sides, said locking unit having at least one tine protruding tangentially and radially inward toward said axial centerline, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said one of said first and third sides;

said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest.

25. (withdrawn) A locking nut insert utilized with an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said

bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said nut insert comprising:

a nut shell having a recess therein about an axial centerline;

an elongated locking unit formed as a cylinder with its cylindrical axis coaxial with said axial centerline, said locking unit having at least one tine protruding tangentially and radially inward toward said cylindrical axis, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said cylinder, said cylinder defining a cut-out at said tine;

a nut formed on an axial inboard end of said cylinder, said nut having a nut thread about an axial centerline which is complementary to said bolt thread;

said locking unit and nut substantially fully inserted into said recess of said nut shell;

said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest thereby permitting only one way rotational movement of said bolt with respect to said locking unit.

26. (withdrawn) A locking assembly for a pipe or rod having a threaded end and a plurality of axial notches inboard said threaded end, said locking assembly comprising:

a cylindrical body defining a nut thread complementary to said threaded end, said nut thread defining an axial centerline;

a locking unit formed in said cylindrical body at a medial position of said nut thread, said locking unit having at least one tine protruding tangentially and radially inward toward said axial centerline, said tine having a distal tine end adapted to latch in said notches of said pipe or rod; said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides outside of said notches.

27. (withdrawn) A locking nut and bolt system comprising:

a bolt having a bolt stem along and an axial centerline and a bolt thread formed on said bolt stem, said bolt thread defining bolt thread crests and bolt thread troughs;

a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope;

a nut having a nut thread defined in an internal passageway and an end face, said nut thread being complementary to said bolt thread;

a recess defined on said end face of said nut below said nut end face;

a locking element having an axially rearward ring member disposed in said nut recess and having a plurality of axially protruding legs and a corresponding plurality of tines, each tine protruding tangentially and radially inward toward said axial centerline, said axially protruding legs depending from said rearward ring member, each said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion attached to said corresponding axially protruding leg;

each distal tine end moves radially inward when said distal tine end is disposed in one or more notches and moves radially outward when said distal tine end rides on said bolt thread crest, and said radially inward and outward movement being visible due to the disposition of said locking element on said end face of said nut, and said lock face of said notch preventing counter-rotational movement of said bolt with respect to said nut when said distal tine end abuts said lock face.

28. (withdrawn) A locking nut and bolt system as claimed in claim 27 wherein said plurality of axially protruding legs and corresponding plurality of tines are circumferentially disposed.

29. (withdrawn) A locking nut and bolt system as claimed in claim 28 wherein said rearward ring member is swaged to said nut.

30. (withdrawn) A locking nut and bolt system as claimed in claim 27 wherein said rearward ring includes one of a key and a keyway, said nut recess defining one of a complementary keyway and key whereby said locking element is keyed to a predetermined position with respect to said nut by alignment of said key and complementary keyway.

31. (withdrawn) An S-shaped locking nut and bolt assembly for a bored panel comprising:  
an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem;

an S-shaped member having first, second and third elongated, generally planar legs;  
a nut formed on one of said second and said third legs, said nut having a nut thread about an axial centerline which is complementary to said bolt thread;

an elongated locking unit formed on the other of said second and third legs, said locking unit formed as a perpendicular structure with a locking axis perpendicular to the plane of said other leg, said locking unit having at least one tine protruding tangentially and radially inward toward said locking axis, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said perpendicular structure, said perpendicular structure defining a cut-out at said tine;

    said S-shaped member adapted to be mounted on said panel with said axial centerline of said nut, said panel bore and said locking axis of said locking unit being substantially coaxially aligned;

    said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest, and the position of said distal tine end being visible due to the disposition of said elongated locking unit on said third leg.

32. (withdrawn) A locking nut and bolt assembly as claimed in claim 31 wherein said perpendicular structure is a cylinder and carries a plurality of tines protruding tangentially and radially toward said axial centerline, said plurality of tines disposed circumferentially about said cylinder.

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39. (withdrawn) An S-shaped locking nut and bolt assembly for a bored panel comprising: an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally

adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem;

an S-shaped member having first, second and third elongated, generally planar legs;

said first and second legs defining coaxial through bores and defining a common axis;

an elongated locking unit formed on said third leg, said locking unit formed as a cylinder with its cylindrical axis perpendicular to the plane of said leg and coaxial with said common axis, said locking unit having at least one tine protruding tangentially and radially inward toward said cylindrical axis, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said cylinder, said cylinder defining a cut-out at said tine;

a nut formed on an axial inboard end of said cylinder, said nut having a nut thread about an axial centerline which is complementary to said bolt thread;

said S-shaped member adapted to be mounted on said panel with said axial centerline of said nut, said panel bore and said cylindrical axis of said locking unit being substantially coaxially aligned;

said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest, and the position of said distal tine end being visible due to the disposition of said elongated locking unit on said third leg.

40. (withdrawn) An S-shaped assembly as claimed in claim 39 wherein said second leg includes an alignment cylinder coaxial with said common axis and sized to capture said nut therein.

41. (withdrawn) A U- or a J-shaped clip and locking nut assembly for a bored panel and an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread

crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said locking nut assembly comprising:

a U or a J-shaped clip member having first and second elongated, generally planar legs;

a single thread nut having an arc less than 360 degrees formed on said first leg about a nut bore having an axial centerline;

a locking element formed on said second leg and defining a locking element bore coaxial with said axial centerline, said locking element having at least one axially protruding leg perpendicular to said planar second leg and having at least one tine, said tine protruding tangentially and radially inward toward said axial centerline, said axially protruding leg depending from said planar second leg, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion attached to said axially protruding leg;

said clip member adapted to be mounted on said panel with said axial centerline of said nut, said panel bore and said locking element bore being substantially coaxially aligned;

said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest, and the position of said distal tine end being visible due to the disposition of said elongated locking element on said second leg.

42: (withdrawn) A locking nut assembly as claimed in claim 41 including a plurality of axially protruding legs, each carrying a respective tine thereon, said axially protruding legs being circumferentially disposed about said axial centerline.

43. (withdrawn) A U-shaped locking nut assembly for a bored panel and an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said locking nut assembly comprising:

    a U-shaped member having a first and a second elongated, generally planar leg;

    a single thread nut having an arc less than 360 degrees formed on said first leg about a nut bore having an axial centerline;

    an elongated locking unit formed on said second leg formed as a cylinder with its cylindrical axis perpendicular to the plane of said second leg, said locking unit having at least one tine protruding tangentially and radially inward toward said cylindrical axis, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said cylinder, said cylinder defining a cut-out at said tine;

    said U-shaped member adapted to be mounted on said panel with said axial centerline of said nut, said panel bore and said cylindrical axis of said locking unit being substantially coaxially aligned;

    said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest, and the position of said distal tine end being visible due to the disposition of said elongated locking unit on said second leg.

44. (withdrawn) A locking nut assembly as claimed in claim 43 wherein said cylinder carries a plurality of tines disposed circumferentially about said cylinder.

45. (withdrawn) A U-shaped locking nut assembly for a bored panel and an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said locking nut assembly comprising:

a U-shaped member having first and second elongated, generally planar legs;

a single thread nut having an arc less than 360 degrees formed on said first leg about a nut bore having an axial centerline;

a locking element formed on said first leg beyond said arc of said nut thread and on said nut bore, said locking element having an axially protruding leg perpendicular to said planar first leg and having a corresponding tine protruding tangentially and radially inward toward said axial centerline, said axially protruding leg depending from said planar first leg on said nut bore, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion attached to said axially protruding leg;

said U-shaped member adapted to be mounted on said panel with said axial centerline of said nut and said panel bore being substantially coaxially aligned;

said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest.

46. (withdrawn) A locking nut assembly as claimed in claim 45 wherein said single nut thread spans an arc less than 360 degrees and said axially protruding leg is circumferentially disposed on said nut bore beyond said single thread arc.

47. (withdrawn) A locking nut assembly as claimed in claim 46 wherein said single thread nut arc is severed into a plurality of arcs and a plurality of axially protruding legs are disposed intermediate said severed thread arcs.

48. (withdrawn) A locking nut assembly as claimed in claim 46 wherein said second leg is truncated.

49. (withdrawn) A locking nut assembly as claimed in claim 46 wherein said second leg defines a bore coaxial with said axial centerline.

50. (withdrawn) A U-shaped locking nut assembly for a bored panel and an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said locking nut assembly comprising:

a U-shaped member having a first and a second elongated, generally planar leg;

a nut formed on said first leg, said nut having a nut thread about an axial centerline which nut thread is complementary to said bolt thread;

an elongated locking unit formed as a cylinder on an outboard axial end of said nut, said locking unit having at least one tine protruding tangentially and radially inward toward said axial

centerline, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said cylinder;

    said U-shaped member adapted to be mounted on said panel with said axial centerline of said nut, said panel bore and said cylinder of said locking unit being substantially coaxially aligned;

    said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest, and the position of said distal tine end being visible due to the disposition of said elongated locking unit on said nut.

51. (withdrawn) A locking nut assembly as claimed in claim 50 wherein said cylinder carries a plurality of tines protruding tangentially and radially toward said axial centerline, said plurality of tines disposed circumferentially about said cylinder.

52. (withdrawn) A U-shaped locking nut assembly for a bored panel and an elongated bolt having a stem and a bolt thread on said stem, said bolt thread defining bolt thread crest and bolt thread troughs, said bolt having a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope on said bolt thread which form a locking channel on said stem, said locking nut assembly comprising:

    a U-shaped member having a first and a second elongated, generally planar leg;

    a nut formed as an elongated, thin walled cylinder on said first leg, said nut having a nut thread about an axial centerline which nut thread is complementary to said bolt thread;

    a locking unit formed on an interior of said nut, said locking unit having a tine protruding tangentially and radially inward toward said axial centerline, said tine formed from a segment of said

thin walled cylinder, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said cylinder;

    said U-shaped member adapted to be mounted on said panel with said axial centerline of said nut and said panel bore being substantially coaxially aligned;

    said distal tine end being adapted to move radially inward when said distal tine end is disposed in one or more notches and move radially outward when said distal tine end rides on said bolt thread crest.

53. (withdrawn) A locking nut assembly as claimed in claim 52 wherein said tine includes a tine body and said distal tine end is disposed at an offset angle with respect to said tine body.

54. (withdrawn) A locking nut and bolt system with a latch closure comprising:  
    a bolt having a bolt stem on an axial centerline and a bolt thread formed on said bolt stem, said bolt thread defining bolt thread crests and bolt thread troughs;

    a plurality of notches defined on said bolt thread generally longitudinally in a predetermined pattern with proximal notches being longitudinally adjacent each other on said bolt thread, each notch having a lock face and an opposing slope;

    a nut having a nut thread defined in an internal passageway and an end face, said nut thread being complementary to said bolt thread;

    a recess defined on and below said end face of said nut;  
    an elongated locking unit having a peripheral wall shaped complementary to said recess and having at least one tine protruding tangentially and radially inward away from said peripheral wall and toward said axial centerline, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said peripheral wall;

a latch moveably disposed on said peripheral wall adjacent said proximal tine portion of said tine, said latch moving over said peripheral wall and capturing said tine between said latch and said peripheral wall in a closed position and moving over said peripheral wall and fully exposing said tine in a locking position;

with said latch in said locking position, said distal tine end moves radially inward when said distal tine end is disposed in one or more notches and moves radially outward when said distal tine end rides on said bolt thread crest, and said lock face of said notch preventing counter-rotational movement of said bolt with respect to said nut when said distal tine end abuts said lock face.

55. (withdrawn) A locking nut and bolt system as claimed in claim 54 wherein said latch spans an axial dimension of said tine.

56. (withdrawn) A locking nut and bolt system as claimed in claim 55 wherein said latch defines one of a channel and a channel member and said peripheral wall defines, at an axially outboard end thereof, one of a complementary channel and a complementary channel member interfit in said one channel and channel member of said latch, said channel and channel member on its respective latch and peripheral wall having a stop which limits movement of said latch with respect to said peripheral wall in said closed position.

57. (withdrawn) A locking nut and bolt system as claimed in claim 56 wherein said peripheral wall includes a radially extending lip a portion of which defines said channel member and said latch defines said channel member thereat.

58. (withdrawn) A locking nut and bolt system as claimed in claim 57 wherein said peripheral wall has a substantially rectangular cross-sectional shape.

59. (withdrawn) A locking nut and bolt system as claimed in claim 56 wherein said peripheral wall has a substantially circular cross-sectional shape.

60. (withdrawn) A locking nut and bolt system as claimed in claim 59 wherein said peripheral wall defines a cylinder and said latch defines a complementary cylinder disposed inside said cylindrical peripheral wall.

61. (withdrawn) A locking nut and bolt system as claimed in claim 60 wherein said cylindrical latch includes an axially outboard cap.

62. (withdrawn) A locking nut and bolt system as claimed in claim 60 wherein said cylindrical peripheral wall includes said channel member and said cylindrical latch includes said channel.

63. (withdrawn) A locking nut and bolt system as claimed in claim 54 wherein said plurality of notches are longitudinally aligned.

64. (withdrawn) A locking nut and bolt system as claimed in claim 54 wherein said plurality of notches are disposed in a spiral on said bolt thread.

65. (withdrawn) A locking nut and bolt system as claimed in claim 60 wherein said cylindrical latch includes a user actuatable control surface to enable said latch to move to and from said locking position with respect to said closed position.

66. (withdrawn) A locking nut and bolt system comprising:  
a bolt having a bolt head and a bolt stem along an axial centerline and a bolt thread formed on said bolt stem;  
a plurality of notches defined on said bolt head, each notch having a lock face and an opposing slope;

a female threaded unit with a nut thread defined in an internal passageway about a central axis and said female threaded unit having an end face, said nut thread being complementary to said bolt thread;

a recess defined below said end face of said female threaded unit;

a locking unit having a peripheral wall complementary to said recess and having at least one tine protruding tangentially and radially inward toward said central axis, said locking unit having a portion thereof disposed in said recess, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said peripheral wall;

said distal tine end moves radially inward when said distal tine end is disposed in one of said notches and moves radially outward when said distal tine end rides on said opposing slope and is otherwise beyond said one of said plurality of notches, and said lock face of each said notch preventing counter-rotational movement of said bolt with respect to said female threaded unit when said distal tine end abuts said lock face.

67. (withdrawn) A locking nut and bolt system as claimed in claim 66 wherein said locking unit and said peripheral wall have an axially open end whereby said radially inward and outward movement of said distal tine end is visible due to the open axial end of said locking unit.

68. (withdrawn) A locking nut and bolt system as claimed in claim 66 wherein said tine is defined in a cut-out on said peripheral wall.

69. (withdrawn) A locking nut and bolt system as claimed in claim 66 wherein said locking unit includes a plurality of tines circumferentially disposed about said central axis.

70. (withdrawn) A locking nut and bolt system comprising:

a bolt having a bolt head and a bolt stem along an axial centerline and a self-threading bolt thread formed on said bolt stem;

a plurality of notches defined on said bolt head, each notch having a lock face and an opposing slope;

a base unit with an open ended passageway defined therein, said passageway having a central axis and being large enough to accommodate said self-threading bolt thread;

a locking unit, mounted onto said base over said open ended passageway, said locking unit having a peripheral wall carrying at least one tine protruding tangentially and radially inward toward said central axis, said tine having a distal tine end adapted to latch on said lock face of said notch and a proximal tine portion adjacent said peripheral wall;

said distal tine end moves radially inward when said distal tine end is disposed in one of said notches and moves radially outward when said distal tine end rides on said opposing slope and is otherwise beyond said one of said plurality of notches, and said lock face of each said notch preventing counter-rotational movement of said bolt with respect to said female threaded unit when said distal tine end abuts said lock face.

71. (withdrawn) A locking nut and bolt system as claimed in claim 70 including a depending leg extending from said locking unit and affixed to said base unit.

72. (withdrawn) A locking nut and bolt system as claimed in claim 71 including upright pillars extending from said base unit to limit rotation of said locking unit relative to said bolt.

73. (withdrawn) A removal tool for a locking nut and bolt combination, said locking nut and bolt combination including a bolt with a bolt thread and a nut with a nut thread in an internal passageway complementary to said bolt thread, a plurality of notches on said bolt thread, said nut

carrying a locking body having an elongated tine with a proximal tine body portion attached to said locking body and a distal tine end protruding into said internal nut passageway and adapted to ride on said bolt thread and fall into at least one of said plurality of notches dependent upon a relative position of said distal tine end and said plurality of notches, said removal tool comprising:

a cylindrical body with an open end carrying a plurality of axially movable, axially outwardly biased, depending legs disposed about said open end at circumferential positions complementary to said bolt thread;

wherein said cylindrical body is adapted to be disposed atop said locking body and said bolt thread whereby one of said depending legs is placed intermediate said proximal tine body portion of said elongated tine and said bolt thread and said cylindrical body is rotated thereby lifting said distal tine end away from said plurality of notches.

74. (withdrawn) A removal tool as claimed in claim 73 wherein said depending legs are captured within guide channels formed on said cylindrical body near said open end.

75. (withdrawn) A removal tool as claimed in claim 74 wherein said depending legs are axially biased outward by a spring.

76. (withdrawn) A removal tool as claimed in claim 75 wherein each depending leg moves independently with respect to each other.

77. (withdrawn) A removal tool as claimed in claim 73 including an outer cylinder complementary to said cylindrical body, said cylindrical body movably disposed inside said outer cylinder, and including a user actuatable control surface protruding from said cylindrical body through a hole in said outer cylinder whereby said cylindrical body is rotated with respect to said outer cylinder based upon movement of said control surface.

78. (withdrawn) A removal tool as claimed in claim 77 wherein said hole forms a partial spiral arc such that said cylindrical body rotates and moves axially outboard based upon the movement of said control surface with respect to said outer cylinder.

79. (withdrawn) A removal tool as claimed in claim 77 wherein said outer cylinder includes a female socket fitting at an opposing end which is opposite said open end of said cylindrical body.

80. (withdrawn) A removal tool and locking nut and bolt combination comprising:  
a bolt with a bolt thread having a plurality of notches on said bolt thread;  
a nut with a nut thread in an internal passageway complementary to said bolt thread;  
a locking body carried by said nut along said internal passageway, said locking body having an elongated tine with a proximal tine body portion attached to said locking body and a distal tine end protruding into said internal nut passageway and adapted to ride on said bolt thread and fall into at least one of said plurality of notches dependent upon a relative position of said distal tine end and said plurality of notches;

a removal tool including a cylindrical body with an open end carrying a plurality of axially movable, axially outwardly biased, depending legs disposed about said open end at circumferential positions complementary to said bolt thread;

wherein said cylindrical body is adapted to be disposed atop said locking body and said bolt thread whereby one of said depending legs is placed intermediate said proximal tine body portion of said elongated tine and said bolt thread and said cylindrical body is rotated thereby lifting said distal tine end away from said plurality of notches.

81. (withdrawn) A removal tool combination as claimed in claim 80 wherein said depending legs are captured within guide channels formed on said cylindrical body near said open end.

82. (withdrawn) A removal tool combination as claimed in claim 81 wherein said depending legs are axially biased outward by a spring.

83. (withdrawn) A removal tool combination as claimed in claim 82 wherein each depending leg moves independently with respect to each other.

84. (withdrawn) A removal tool combination as claimed in claim 80 including an outer cylinder complementary to said cylindrical body, said cylindrical body movably disposed inside said outer cylinder, and including a user actuatable control surface protruding from said cylindrical body through a hole in said outer cylinder whereby said cylindrical body is rotated with respect to said outer cylinder based upon movement of said control surface.

85. (withdrawn) A removal tool combination as claimed in claim 84 wherein said hole forms a partial spiral arc such that said cylindrical body rotates and moves axially outboard based upon the movement of said control surface with respect to said outer cylinder.

86. (withdrawn) A removal tool combination as claimed in claim 84 wherein said outer cylinder includes a female socket fitting at an opposing end which is opposite said open end of said cylindrical body.